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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/787,530

02/26/2004

Kumin Yang

RPI-3877

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5409 7590 07/26/2007  
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EXAMINER

NILAND, PATRICK DENNIS

ART UNIT

PAPER NUMBER

1714

MAIL DATE

DELIVERY MODE

07/26/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/787,530

Applicant(s)

YANG ET AL.

Examiner

Patrick D. Niland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2007.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9, 11, 14-16 and 29-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, 11, 14-16, and 29-45 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. The amendment of 5/10/07 has been entered. Claims 1-6, 9, 11, 14-16, and 29-45 are pending.

2. Claims 30-45 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the disclosed "swelling agents", does not reasonably provide enablement for the entire scope of "swelling agents" encompassed by the instant claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

A. The instant specification, page 27 includes a large array of compounds which are not disclosed nor described as "swelling agents". Note "or the like" in regard to "swelling agents". It would require undue experimentation to determine all of the swelling agents in this potentially infinite list of compounds which would function in the instantly claimed invention and which are not disclosed by the applicant.

In re Wands has 8 criteria, MPEP 2164.01(a), as shown below.

- (A)The breadth of the claims;
- (B)The nature of the invention;
- (C)The state of the prior art;
- (D)The level of one of ordinary skill;
- (E)The level of predictability in the art;
- (F)The amount of direction provided by the inventor;
- (G)The existence of working examples; and

(H)The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The claimed “swelling agents” encompass an infinite number of compounds (Wands factor A). The chemical arts are unpredictable to the ordinary skilled artisan (Wands factors B, C, D, and E). The ordinary skilled artisan has not even contemplated all of the “swelling agents” encompassed by the instant claims nor figured out how to make them (Wands factors A-E). The instant specification gives scant direction as to how to make all of the “swelling agents” encompassed by the instant claims and how to choose the ones that will function according to the instantly claimed invention (Wands factors F-G). It would require an undue, e.g. infinite, amount of experimentation to determine how to make all of the “swelling agents” encompassed by the instant claims and then to figure out which ones will function according to the instantly claimed invention (Wands factor H). The claims are therefore not commensurate in scope with the enabling specification.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 4, 14-16, and 29-45 are rejected under 35 U.S.C. 102(b) as anticipated

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by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mielewski (US 2002/0082331). (NOTE: The reference qualifies as a 102(b) reference because applicant does not have full support for the claimed method in the provisional application and thus has an effective filing date of 2/26/04).

Mielewski discloses a method of mixing layered silicate with a polymer to form a treatable silicate-polymer mixture and contacting the treatable mixture with the supercritical fluid to exfoliate the silicate particles so that the particles disperse within the polymer (abstract). The layered silicate is preferably montmorillonite, the polymer is polypropylene, and the supercritical fluid is carbon dioxide (para 17-18). The method includes mixing the layered silicate with the polymer to form a mixture (para 20), heating to form a flowable melt (para 20), contacting the polymer-clay mixture with a pressurized supercritical fluid exceeding the critical temperature of the SCF (para 21-22), and depressurizing the contacted mixture to exfoliate the silicate particles such that the particles are substantially dispersed (para 23). Mielewski discloses that the step of depressurizing includes immediately depressurizing the extrudate down to ambient conditions, which may be accomplished when the extrudate exits the extruder, at which time the pressure drops to ambient (para 23), and such a pressure drop would be a continuous (monotonic) decrease to ambient pressure. The example discloses that the extruder operates at a temperature of about 200 degrees Celsius (para 28). Although Mielewski is silent with respect to the solubility parameters of the components, particularly montmorillonite, the methods and compositions therein are substantially similar to the currently claimed Composition (which includes the recited carbon dioxide SCF, PP polymer, and

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montmorillonite clay), thus it is examiner's position that although it is not specifically recited, the composition in Mielewski would nonetheless inherently meet the requirements for the currently claimed solubility parameters, or alternatively, would obviously have been present in the Mielewski product, absent evidence to the contrary.

The applicant's arguments have been fully considered. The things the reference do not teach were stated above. These arguments, particularly relating to solubility parameters are not disagreed with entirely. The applicant's response fails to address the one critical feature of the above rejection, namely are the instantly claimed solubility parameter requirements inherent to the above discussed combinations of polymer, clay, and SCF of the reference. See MPEP 2112. As noted, the instant claims encompass the use of the reference's components. This alone gives reason to believe that the reference combination of ingredients falls within the scope of the instant claims. Further consideration of the apparent relative polarities of the reference components and those of the instant specification together with the basic teachings of the concept of polarity and solubility parameters taught in basic undergraduate chemistry courses gives the appearance that the reference method meets the requirements of the above claims. The PTO has no experimental facilities to make such determinations and the applicant has not proven the instantly claimed solubility parameter requirements are not inherent to the reference's method. This rejection is therefore maintained.

6. Claims 5, 9, 11, and 29-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mielewski (US 2002/0082331) in view of Lee (US 2003/0205832).

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The discussion with respect to Mielewski in paragraph 5 above is incorporated herein by reference.

Although Mielewski discloses an extruder, he does not disclose use of a twin screw extruder.

Lee discloses a methods of producing nanocomp0sites with nanoclays such as montmorillonite mixed with polymers (abstract; para 7). Supercritical CO<sub>2</sub> is dissolved in the polymer (para 5). Preparation of the nanocomposite includes using a co-rotating twin screw extruder at a screw speed of 200 rpm (para 64-69). It would have been obvious to one of ordinary skill to use a co-rotating twin screw extruder as the extruder in Mielewski because Lee discloses that it is effective in producing nanocomposites contacted with supercritical CO<sub>2</sub> and that the clay has good dispersion and is exfoliated (para 64-75).

Also, although Mielewski does not disclose that the pressure varies essentially discontinuously, he discloses that the extrudate is depressurizing to ambient pressures, and since atmospheric pressure can vary, it would have been obvious to one of ordinary skill in the art that changes in air pressure would result in small fluctuations when the pressure is near ambient.

This rejection is maintained for the same reasons as stated in paragraph 5 above.

7. Claim 6 is allowable over the prior art considered and claim 3 remains objected to for the reasons of record.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick D. Niland whose telephone number is 571-272-1121. The examiner can normally be reached on Monday to Thursday from 10 to 5.

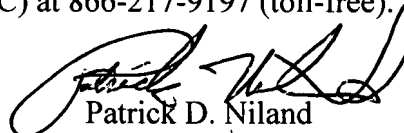
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan, can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR



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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Patrick D. Niland', is positioned above the printed name.

Patrick D. Niland  
Primary Examiner  
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